The MINERνA Requirement for the NOvA Excavation

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Nov 7, 2011

Goals

- Goal is for MINERnA to be running through the shutdown
  - Can determine if the excavation is creating problems
    - Without running, bad problems may exist and we would not know
  - In addition, electronics & computers may not work if it is turned off and on, especially if it for a long period of time
  - We require the MINOS near detector (ND) to take data
- If the excavation is during NuMI beam running, we require that all services we need for beam data are there.
  - Need to run MINOS ND
  - Cooling, Electrical Power – especially for MINOS magnet
  - Access to the both MINOS and MINERvA Detector
    - Needed hardware fits through Emergency Egress

Conditions during Shutdown

- We know we can run with the conditions that exist in the hall right now, Therefore, we require that the condition not be worse than the conditions that exist now.
  - We will need better understanding of some of these conditions, especially dust
- For the electrical Issues, we requested the 14th floor electrical engineers, which help us build MINERvA, report on the requirement. That group was headed by Boris Baldin
- We discussed the mechanical issues with Jim Kilmer

He Target

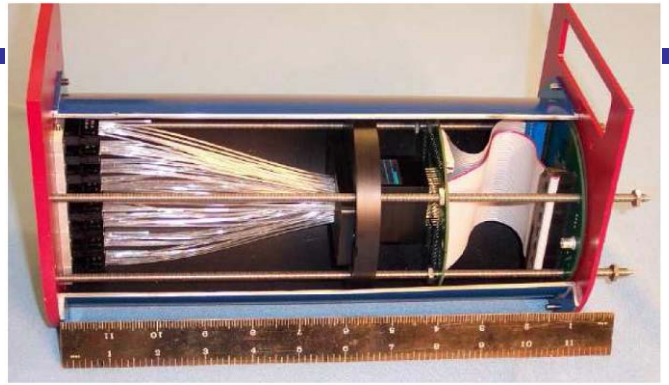
- He target will be filled with He.
- There will be a roughly 5 day shutdown due to moving the services
  - We will lose ½ the He

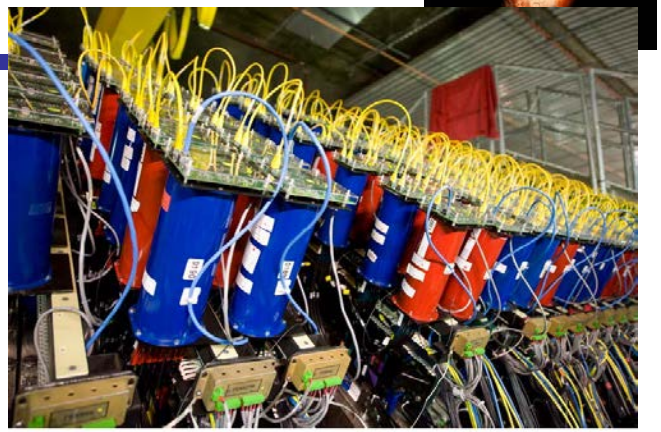
    Roughly $9000
- We request the Lab to keeps cryogenics be powered while the services are being moved
- We requested and updated ODH analysis
- If we do not have power, we request the he target be topped up with he as the dewars will be almost impossible to deliver

Ventilation during Power Outage

- We require EVA-4 fan be working during the 5 day shutdown
  - Its power iscoming from the cavern
  - Helium will be evaporating from the target and since both MINERvA and MINOS have PMT we need to remove it from the cavern.

Requirements



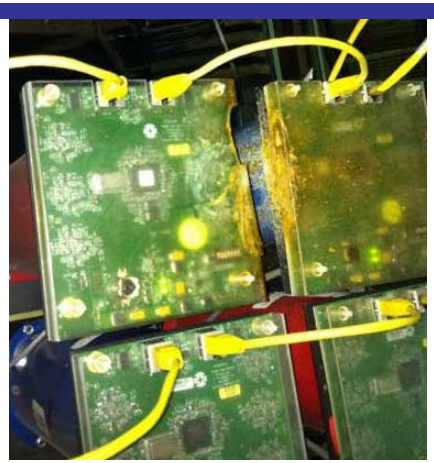


- Keep conditions no worse than now
  - No additional dust particles created in MINOS Hall
  - Temp < 80F at top of MINERvA detector where electronics are.
  - Relative Humidity <25% as measured by MINOS
  - Accelerometers to measure vibrations on PMTs
  - No water leakage or material falling from ceiling on detector
  - Notification of power outages

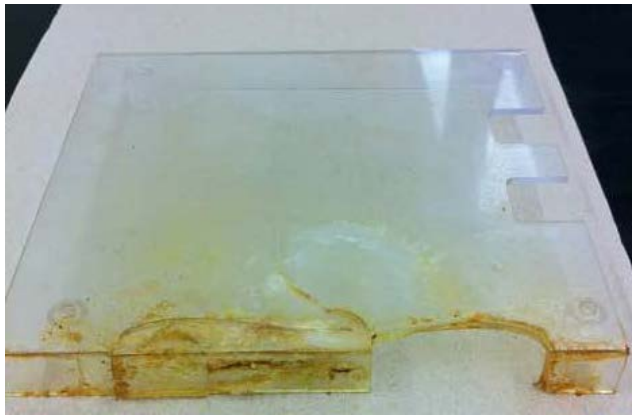
Dust

- The biggest concern is dust – especially conducting dust
- If the material being excavated contains conducting materials, like iron, special care must be taken.
- Dust of any size can effect the electronics
- Dust barrier must be functioning at all times
- No additional dust created in MINOS Hall
- We require the dust level be measured now, before the excavation, and during the excavation.
  - We require the Lab work with us to determine and to acquire a device appropriate for measuring the dust levels
  - Measure dust levels now to determine levels during excavation and to understand specifications
  - Dust level no higher than 10% above existing levels

No Water or Debris From Ceiling falling on Detector



A stalactite from the ceiling fell on the plastic cover damaging some FEBs



- We require a cover over the detector,
- Vibration might cause material or water to fall from the ceiling
  - Material may fall on the connectors or light tight baggies creating light leaks which will be very difficult to fix
- Herculite cover over the detector which enables us to run
  - Needs Fire protection
  - Be able to fix FEBs and PMTs if running beam

Vibrations

- Mechanically the detector is mounted robust enough that vibration should not be a problem
- The previous stated concerns about vibrations
  - Effects on PMTs
  - Particles and water from ceiling
- We are looking into the effects of the vibration on our computers i.e. disk drives. Hence, we want to know the level of the vibration.

Temperature Light Issues

- Accelerated Aging Test done by MINOS
- Done by Brahesh Choudhary at Caltech for MINOS
- Full-Length Scintillator and clear cables exposed to 4 different temp for 6 months
  - 20C, 28C, 38C, 50C
- Non reversable light decrease
  - 1.2%*exp(T-68F)/18F) per year
  - 1.8% at 75F, 2.3% at 80F, 4.1% at 90F
- The temp in the MINOS hall should not exceed 80F whether the electronics is on or off
- Both MINOS and MINERvA have devices to record the ambivalent temperature